E3Z

The New Standard for Compact, Long-range Photoelectric Sensors Conserves Energy and Natural Resources, One Million Sold Yearly

- Long sensing distance of 15 m for Through-beam Models, 4 m for Retro-reflective Models, and 1 m for Diffuse-reflective Models.
- Unique algorithm minimizes external interference from inverter fluorescent lighting.
- Conserves energy and represents ongoing efforts aimed at eliminating materials containing lead.
- Provides a high degree of protection (IP67), mutual interference prevention, and EN standard compliance.
- Mechanical axis and optical axis offset always less than ±2.5° greatly simplifies optical axis alignment.

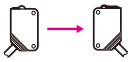
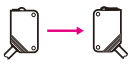
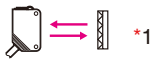
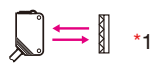
CE

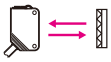
⚠ Be sure to read *Safety Precautions* on page 9.

Ordering Information

Sensors

Red light Infrared light

Sensing method	Appearance	Connection method	Sensing distance	Model	
				NPN output	PNP output
Through-beam		Pre-wired (2 m) *3, *4	15 m	E3Z-T61 *5 *6	E3Z-T81
		Connector (M8, 4 pins)		E3Z-T66	E3Z-T86
		Pre-wired (2 m) *3	10 m	E3Z-T61A *5	E3Z-T81A
		Connector (M8, 4 pins)		E3Z-T66A	E3Z-T86A
		Pre-wired (2 m) *3	30m	E3Z-T62	E3Z-T82
		Connector (M8, 4 pins)		E3Z-T67	E3Z-T87
		Pre-wired (2 m) *3		E3Z-T62-G0	E3Z-T82-G0
		Connector (M8, 4 pins)		E3Z-T67-G0	E3Z-T87-G0
Oil-resistive Through-beam		Pre-wired (2 m)	15 m	E3Z-T61K	E3Z-T81K
		Pre-wired Connector (M8, 4 pins)		E3Z-T61K-M3J	E3Z-T81K-M3J
Retro-reflective with MSR function	 *1	Pre-wired (2 m) *3, *4	4 m *2 (100 mm)	E3Z-R61 *5 *6	E3Z-R81
		Connector (M8, 4 pins)		E3Z-R66	E3Z-R86
Oil-resistive Retro-reflective with MSR function	 *1	Pre-wired (2 m)	*2	E3Z-R61K	E3Z-R81K
		Pre-wired Connector (M8, 4 pins)	3 m (150 mm)	E3Z-R61K-M3J	E3Z-R81K-M3J
Diffuse-reflective		Pre-wired (2 m) *3, *4	5 to 100 mm (wide view)	E3Z-D61 *5 *6	E3Z-D81
		Connector (M8, 4 pins)		E3Z-D66	E3Z-D86
		Pre-wired (2 m) *3, *4	1 m	E3Z-D62 *5 *6	E3Z-D82
		Connector (M8, 4 pins)		E3Z-D67	E3Z-D87
Oil-resistive Diffuse-reflective		Pre-wired (2 m)	5 to 100 mm (wide view)	E3Z-D61K	E3Z-D81K
		Pre-wired Connector (M8, 4 pins)		E3Z-D61K-M3J	E3Z-D81K-M3J
		Pre-wired (2 m)	1 m	E3Z-D62K	E3Z-D82K
		Pre-wired Connector (M8, 4 pins)		E3Z-D62K-M3J	E3Z-D82K-M3J

Sensing method	Appearance		Connection method	Sensing distance	Model	
					NPN output	PNP output
Distance-settable			Pre-wired (2 m) *3	20 to 40 mm (BGS min setting) 20 to 200 mm (BGS max setting)	**E3Z-LS61*5**	**E3Z-LS81**
			Standard M8 Connector	40 min. Incident threshold (FGS min setting) 200 min. Incident threshold (FGS max setting)	**E3Z-LS66**	**E3Z-LS86**
			Pre-wired (2 m) *3	2 to 20 mm (BGS min setting)	**E3Z-LS63**	**E3Z-LS83**
			Standard M8 Connector	2 to 80 mm (BGS max setting)	**E3Z-LS68**	**E3Z-LS88**
Narrow-beam Reflective			Pre-wired (2 m) *3	90±30 mm	**E3Z-L61 *5**	**E3Z-L81**
			Standard M8 Connector		**E3Z-L66**	**E3Z-L86**
Retro-reflective without MSR function for clear, plastic bottles	 *1		Pre-wired (2 m) *3	500 mm (80 mm) *2	**E3Z-B61 *5**	**E3Z-B81**
			Standard M8 Connector		**E3Z-B66**	**E3Z-B86**
			Pre-wired (2 m) *3	2 m (500 mm) *2	**E3Z-B62 *5**	**E3Z-B82**
			Standard M8 Connector		**E3Z-B67**	**E3Z-B87**
Slit-type Through-beam		1 axis	Pre-wired (2 m) *3	25 mm	**E3Z-G61 *5**	**E3Z-G81**
		2 axes			**E3Z-G62 *5**	**E3Z-G82**
		1 axis	Pre-wired M8 Connector		**E3Z-G61-M3J**	**E3Z-G81-M3J**
		2 axes			**E3Z-G62-M3J**	**E3Z-G82-M3J**

Note: The sensing distance of Oil-resistive Retro-reflective models is different from that of standard Retro-reflective models.
*1. The Reflector is sold separately. Select the Reflector model most suited to the application.
*2. The sensing distance specified is possible when the E39-R1S used. Values in parentheses indicate the minimum required distance between the Sensor and Reflector.
*3. Models with a 0.5-m cable are available as a standard feature for products marked *3. When ordering, specify the cable length by adding the code "0.5M" to the model number (e.g., E3Z-T61 0.5M).
*4. Pre-wired M12 Connectors are available for models in the table marked *4. These models have the -M1J suffix. (Example: E3Z-T61-M1J)
*5. Press-fit e-CON Pre-wired Connectors are available with 0.3-m, 0.5-m, and 2-m cables for models in the table marked *5.
The model number is E3Z-□6□-ECON. The connector is the E39-ECON□M with a 2-m or 5-m cable and a connector on one end or the E39-ECONW□M with a 0.5-m to 2-m cable (length increases in 0.1-m increments) and connectors at both ends.
This e-CON specification is rapidly becoming the standard for FA equipment and connector manufacturers.
*6. Clamp-type e-CON Pre-wired Connectors are available with a 2-m cable. The suffix for these models is -ECON-C. (Example: E3Z-T61-ECON-C 2 M) The connectors are E-39-ECON □M with a 2-m or 5-m cable and a connector on one end or the E39-ECONW□M with a 0.5-m to 2-m cable (length increases in 0.1-m increments) and connectors at both ends. This e-CON specification is rapidly becoming the standard for FA equipment and connector manufacturers.

Accessories (Order Separately)

Slit

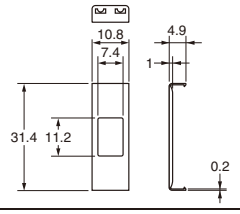
Slit width	Sensing distance		Minimum detectable object (typical)	Model	Contents
	E3Z-T□□	E3Z-T□□A			
0.5 mm dia.	50 mm	35 mm	0.2 mm dia.	**E39-S65A**	One set (contains Slits for both the Emitter and Receiver)
1 mm dia.	200 mm	150 mm	0.4 mm dia.	**E39-S65B**	
2 mm dia.	800 mm	550 mm	0.7 mm dia.	**E39-S65C**	
0.5 × 10 mm	1 m	700 mm	0.2 mm dia.	**E39-S65D**	
1 × 10 mm	2.2 m	1.5 m	0.5 mm dia.	**E39-S65E**	
2 × 10 mm	5 m	3.5 m	0.8 mm dia.	**E39-S65F**	

Reflectors

Name	E3Z-R Sensing distance (typical)*	Model	Quantity	Remarks
Reflector	3 m (100 mm) (rated value)	**E39-R1**	1	• Retro-reflective models are not provided with Reflectors. • The MSR function is enabled.
	4 m (100 mm) (rated value)	**E39-R1S**	1	
	5 m (100 mm)	**E39-R2**	1	
	2.5 m (100 mm)	**E39-R9**	1	
	3.5 m (100 mm)	**E39-R10**	1	
Fog Preventive Coating	3 m (100 mm)	**E39-R1K**	1	
Small Reflector	1.5 m (50 mm)	**E39-R3**	1	
Tape Reflector	700 mm (150 mm)	**E39-RS1**	1	
	1.1 m (150 mm)	**E39-RS2**	1	
	1.4 m (150 mm)	**E39-RS3**	1	

Note: The actual sensing distance may be reduced to approximately 70% of the typical sensing distance when using a Reflector other than E39-R1 or E39-R1S.
* Values in parentheses indicates the minimum required distance between the Sensor and Reflector.

Mutual Interference Protection Filter

Sensing distance	Appearance/Dimensions	Model	Quantity	Remarks
3 m		**E39-E11**	Two sets each for the Emitter and Receiver (total of four pieces)	Can be used with the E3Z-T□□A Through-beam models. The arrow indicates the direction of polarized light. Mutual interference can be prevented by altering the direction of polarized light from or to adjacent Emitters and Receivers.

Mounting Brackets

Appearance	Model	Quantity	Remarks	Appearance	Model	Quantity	Remarks
	**E39-L153**	1	Mounting Brackets		**E39-L98**	1	Metal Protective Cover Bracket *
	**E39-L104**	1			**E39-L150**	1 set	(Sensor adjuster)
	**E39-L43**	1	Horizontal Mounting Brackets *		**E39-L151**	1 set	Easily mounted to the aluminum frame rails of conveyors and easily adjusted. For left to right adjustment
	**E39-L142**	1	Horizontal Protective Cover Bracket *				
	**E39-L44**	1	Rear Mounting Bracket		**E39-L144**	1	Compact Protective Cover Bracket (For E3Z only) *

Note: When using Through-beam models, order one bracket for the Receiver and one for the Emitter.
* Cannot be used for Standard Connector models.

Sensor I/O Connectors

Size	Cable	Appearance	Cable type		Model
M8 *	Standard	Straight 	2 m	4-wire	**XS3F-M421-402-A**
			5 m		**XS3F-M421-405-A**
		L-shaped 	2 m		**XS3F-M422-402-A**
			5 m		**XS3F-M422-405-A**
M12 * (For -M1J models)		Straight 	2 m	3-wire	**XS2F-D421-DC0-A**
			5 m		**XS2F-D421-GC0-A**
		L-shaped 	2 m		**XS2F-D422-DC0-A**
			5 m		**XS2F-D422-GC0-A**
e-CON		Single-end connector 	2 m	4-wire	**E39-ECON2M**
			5 m		**E39-ECON5M**
		Double-end connectors 	0.5 to 1 m		**E39-ECONW□M** □ indicates cable length (in units of m). Specify with 0.1-increments.
			1.1 to 1.5 m		
			1.6 to 2 m		

Ratings and Specifications

Item	Model	Through-beam			Retro-reflective with MSR function		Diffuse-reflective	
	NPN output	E3Z-T61(K) E3Z-T66	E3Z-T62 E3Z-T67	E3Z-T61A E3Z-T66A	E3Z-R61/R66	E3Z-R61K	E3Z-D61(K)/D66	E3Z-D62(K)/D67
	PNP output	E3Z-T81(K) E3Z-T86	E3Z-T82 E3Z-T87	E3Z-T81A E3Z-T86A	E3Z-R81/R86	E3Z-R81K	E3Z-D81(K)/D86	E3Z-D82(K)/D87
Sensing distance		15 m	30 m	10 m	4 m (100 mm)* (when using E39-R1S) 3 m (100 mm)* (when using E39-R1)	3 m (150 mm)* (when using E39-R1S) 2 m (100 mm)* (when using E39-R1)	White paper (100 × 100 mm): 100 mm	White paper (300 × 300 mm): 1 m
Spot diameter		---						
Standard sensing object		Opaque: 12-mm dia. min.			Opaque: 75-mm dia. min.		---	
Minimum detectable object		---						
Differential travel		---					20% max. of setting distance	
Directional angle		Both emitter and receiver: 3 to 15°			2 to 10°		---	
Light source (wavelength)		Infrared LED (870 nm)		Red LED (660 nm)	Red LED (660 nm)		Infrared LED (860 nm)	
Power supply voltage		12 to 24 VDC±10%, ripple (p-p): 10% max.						
Current consumption		35 mA max. (Emitter: 15 mA max., Receiver: 20 mA max.)			30 mA max.			
Control output		Load power supply voltage: 26.4 VDC max., Load current: 100 mA max. Residual voltage: Load current of less than 10 mA: 1 V max. Load current of 10 to 100 mA: 2 V max. Open collector output (NPN/PNP depending on model) Light-ON/Dark-ON selectable						
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection, and Reversed output polarity protection			Reversed power supply polarity protection, Output short-circuit protection, Mutual interference prevention, and Reversed output polarity protection			
Response time		Operate or reset: 1 ms max.	Operate or reset: 2 ms max.	Operate or reset: 1 ms max.				
Sensitivity adjustment		One-turn adjuster						
Ambient illumination (Receiver side)		Incandescent lamp: 3,000 lx max. Sunlight: 10,000 lx max.						
Ambient temperature range		Operating: –25 to 55°C, Storage: –40 to 70°C (with no icing or condensation)						
Ambient humidity range		Operating: 35% to 85%, Storage: 35% to 95% (with no condensation)						
Insulation resistance		20 MΩ min. at 500 VDC						
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min						
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions						
Shock resistance		Destruction: 500 m/s^2 3 times each in X, Y, and Z directions						
Degree of protection		IP67 (IEC 60529), Oil resistive models: IP67 (IEC 60529) (in-house standards: oilproof), excluding cables and connectors						
Connection method		Pre-wired cable (standard length: 2 m and 0.5m), Connector (M8, 4 pins), Pre-wired Connector (M8, 4 pins) (Oil-resistive models only)						
Indicator		Operation indicator (orange) Stability indicator (green) Emitter has power indicator (orange) only.						
Weight (packed state)	Pre-wired cable (2 m)	Approx. 120 g			Approx. 65 g			
	Connector (M8, 4 pins)	Approx. 30 g			Approx. 20 g			
	Pre-wired Connector (M8, 4 pins) (oil-resistive models only)	Approx. 50 g			Approx. 30 g			
Material	Case	PBT (polybutylene terephthalate)						
	Lens	Modified polyarylate			Methacrylic resin		Modified polyarylate	
Accessories		Instruction manual (Neither Reflectors nor Mounting Brackets are provided with any of the above models.)						

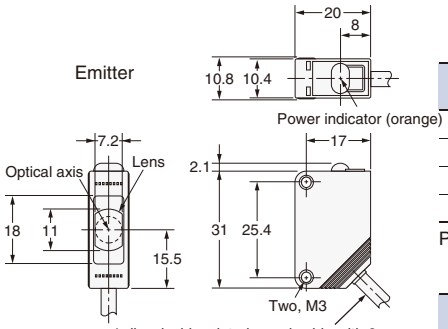
Note: Oil-resistive Retro-reflective models have a different sensing distance than standard Retro-reflective models.
* Values in parentheses indicate the minimum required distance between the Sensor and Reflector.

Dimensions

(Unit: mm)

Sensors

Through-beam
Pre-wired Models
E3Z-T61(K)
E3Z-T81(K)
E3Z-T61A
E3Z-T81A
E3Z-T62(-G0)
E3Z-T82(-G0)



4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.2 mm² (AWG24), Insulator diameter: 1.1 mm), Standard length: 2 m

(Excluding -G0)

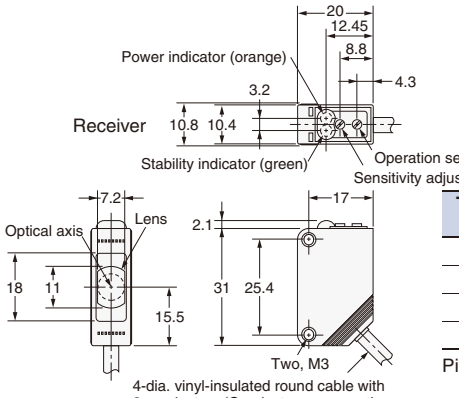
Terminal No.	Specifications
1	+V
2	---
3	0V
4	---

Pins 2 and 4 are not used.

(-G0)

Terminal No.	Specifications
1	+V
2	Input
3	0V
4	---

4 is not used.

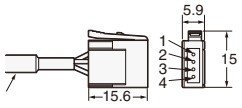


4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.2 mm² (AWG24), Insulator diameter: 1.1 mm), Standard length: 2m

Terminal No.	Specifications
1	+V
2	---
3	0V
4	Output

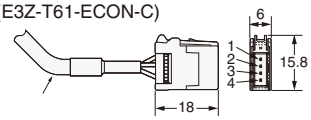
Pin 2 is not used.

Press-fit e-CON Pre-wired Connector



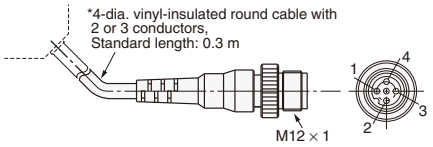
*4-dia. vinyl-insulated round cable with 2 or 3 conductors, Standard lengths: 0.3 m, 0.5 m, and 2 m

Clamp-type e-CON Pre-wired Connector (E3Z-T61-ECON-C)

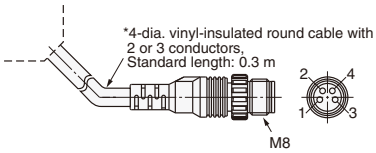


*4-dia. vinyl-insulated round cable with 2 or 3 conductors, Standard length: 2 m

M12 Pre-wired Connector (E3Z-T□□-M1J)

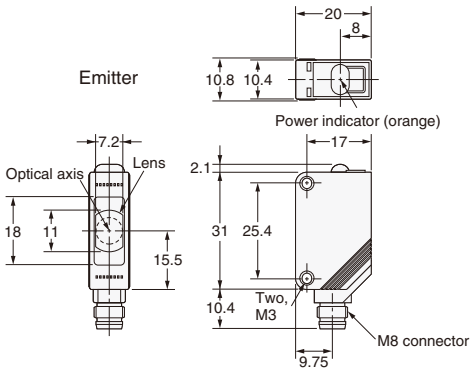


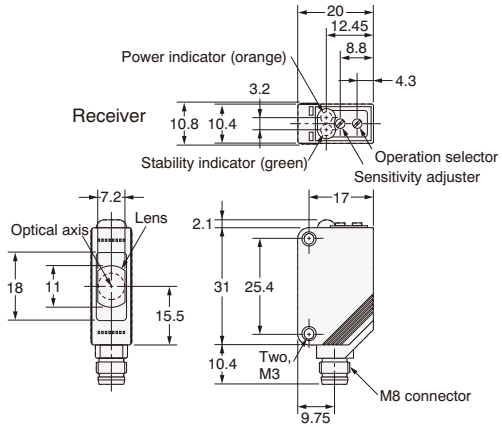
M8 Pre-wired Connector (E3Z-T□□K-M3J)



* The Emitter cable has two conductors and the Receiver cable has three conductors.

Through-beam
Connector Models
E3Z-T66
E3Z-T86
E3Z-T66A
E3Z-T86A
E3Z-T67(-G0)
E3Z-T87(-G0)

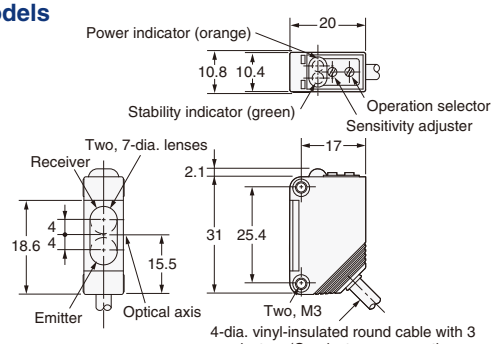




Retro-reflective Models

Pre-wired Models

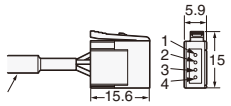
E3Z-R61(K)
E3Z-R81(K)



4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.2 mm² (AWG24), Insulator diameter: 1.1 mm), Standard length: 2m

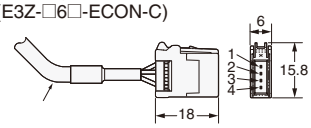
Terminal No.	Specifications
1	+V
2	---
3	0V
4	Output

Press-fit e-CON Pre-wired Connector



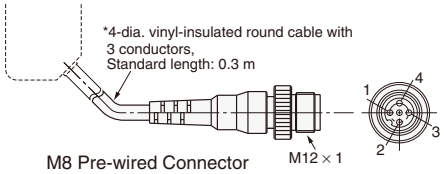
*4-dia. vinyl-insulated round cable with 3 conductors, Standard lengths: 0.3 m, 0.5 m, and 2 m

Clamp-type e-CON Pre-wired Connector (E3Z-□6□-ECON-C)

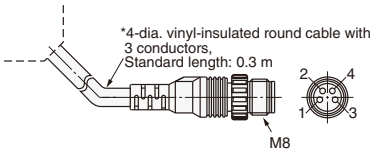


*4-dia. vinyl-insulated round cable with 3 conductors, Standard length: 2 m

M12 Pre-wired Connector (E3Z-□□□-M1J)

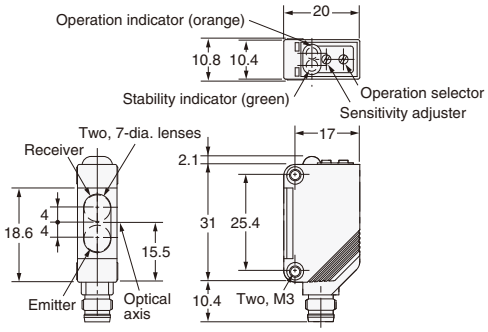


M8 Pre-wired Connector (E3Z-T□□K-M3J)



Connector Models

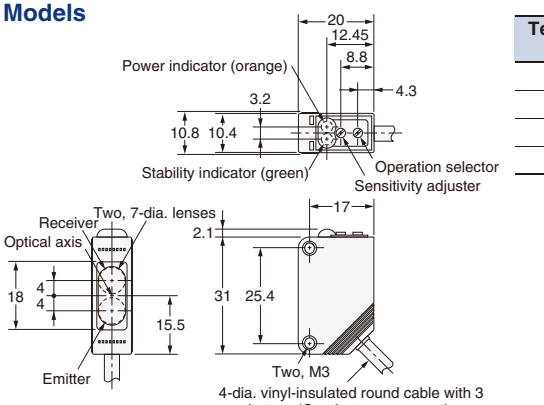
E3Z-R66
E3Z-R86



Diffuse-reflective Models

Pre-wired Models

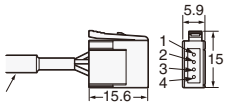
E3Z-D61(K)
E3Z-D81(K)
E3Z-D62(K)
E3Z-D82(K)



4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.2 mm² (AWG24), Insulator diameter: 1.1 mm), Standard length: 2m

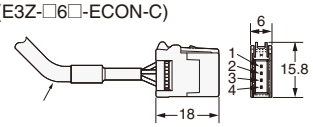
Terminal No.	Specifications
1	+V
2	---
3	0V
4	Output

Press-fit e-CON Pre-wired Connector



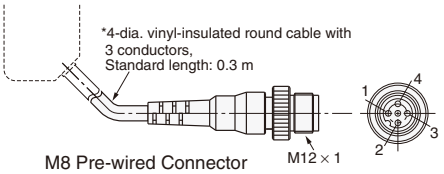
*4-dia. vinyl-insulated round cable with 3 conductors, Standard lengths: 0.3 m, 0.5 m, and 2 m

Clamp-type e-CON Pre-wired Connector (E3Z-□6□-ECON-C)

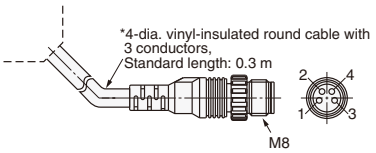


*4-dia. vinyl-insulated round cable with 3 conductors, Standard length: 2 m

M12 Pre-wired Connector (E3Z-□□□-M1J)

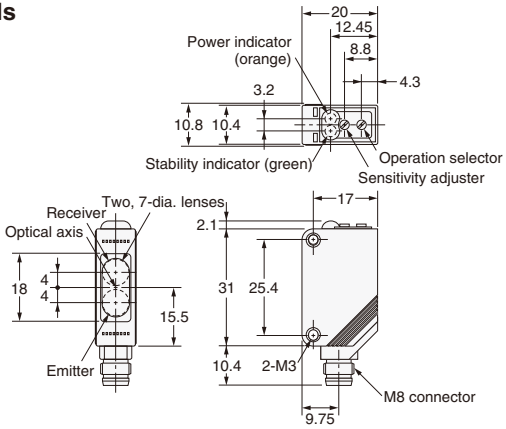


M8 Pre-wired Connector (E3Z-T□□K-M3J)



Connector Models

E3Z-D66
E3Z-D86
E3Z-D67
E3Z-D87



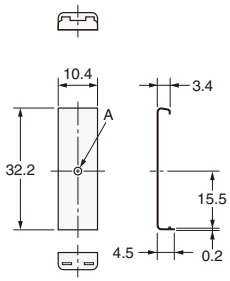
e-CON Connector Configurations

Wiring method	Sensor connectors
Press-fit	37104-3122-000FL (made by Sumitomo 3M)
Clamp	XN2A-1430 (made by OMRON)

Accessories (Order Separately)

Slits

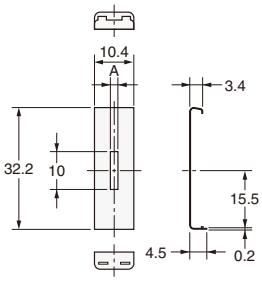
E39-S65A
E39-S65B
E39-S65C



Model	Size A	Material
E39-S65A	0.5 dia.	SUS301 stainless steel
E39-S65B	1.0 dia.	
E39-S65C	2.0 dia.	

Slits

E39-S65D
E39-S65E
E39-S65F



Model	Size A	Material
E39-S65D	0.5	SUS301 stainless steel
E39-S65E	1.0	
E39-S65F	2.0	

Reflectors

Mounting Brackets